

ELLIPTICAL EXERCISING APPARATUS**BACKGROUND OF THE INVENTION****1. Field of the Invention**

The invention relates to an exercising apparatus,
5 more particularly to an elliptical exercising
apparatus.

2. Description of the Related Art

Referring to Figure 1, a conventional elliptical
exercising apparatus is shown to comprise a main frame
10 1, a crank assembly 2, two handle assemblies 3, and two
pedal assemblies 4. The main frame 1 includes a base
support 101 disposed on the ground, and an upstanding
support 102 mounted on a front end portion of the base
support 101. The crank assembly 2 includes a crank wheel
15 201 connected pivotally to a rear end portion of the
base support 101, and two crank members 202 connected
pivotally and respectively to two opposite sides of the
crank wheel 201. The handle assemblies 3 are connected
pivotally and respectively to two opposite sides of the
20 upstanding support 102. Each of the pedal assemblies
4 includes a pedal axle 401 and a pedal member 402: The
pedal axle 401 has a front end connected pivotally to
a bottom end of a corresponding handle assembly 3, and
a rear end connected pivotally to a corresponding crank
25 member 202. The pedal member 402 is mounted fixedly on
the respective pedal axle 401.

In use, the user steps on the pedal members 402 with

two hands grasping respectively the top ends of the handle assemblies 3. Then, through coordination of the swinging movement of the handle and pedal assemblies 3, 4, an exercise simulating a striding movement is effected.

However, since the pedal members 402 are fixed respectively on the pedal axles 401, the pedal members 402 can only move along with the pedal axles 401. The pedal axles 401 are, in turn, connected pivotally and respectively to the handle assemblies 3 and the crank members 202, so that movement of the pedal members 402 are limited by the crank members 202 and so that the largest front-to-rear distance that can be traveled by the pedal members 402 is roughly equal to the sum of the lengths of the two crank members 202. As such, the stepping distance between the user's feet is limited such that the user's leg muscles cannot be stretched fully. Furthermore, if the length of each crank member 202 is increased so as to obtain a larger stepping distance, the body structure of the conventional elliptical exercising apparatus is also increased, thereby making assembly, storage, and use of the apparatus inconvenient.

SUMMARY OF THE INVENTION

Therefore, the object of the present invention is to provide an elliptical exercising apparatus that is capable of overcoming the aforementioned drawbacks of

the prior art.

According to this invention, an elliptical exercising apparatus comprises a main frame, a crank assembly, two handles, two rocker arms, two pedal axles, two pedal members, and two connecting arms. The main frame has a base support adapted to be disposed on the ground, and an upstanding support extending upright from a front end portion of the base support. The crank assembly includes a crank wheel connected rotatably to a rear end portion of the base support, and two crank members connected respectively to two opposite sides of the crank wheel. The handles are connected pivotally and respectively to two opposite sides of the upstanding support. The rocker arms are connected respectively to the handles. Each of the rocker arms has upper and lower connection parts. Each of the pedal axles has a front end connected pivotally to the upper connection part of a corresponding one of the rocker arms, and a rear end connected to a corresponding one of the crank members. Each of the pedal members is mounted slidably on a corresponding one of the pedal axles. Each of the connecting arms has a front end connected to the lower connection part of a corresponding one of the rocker arms, and a rear end connected to a corresponding one of the pedal members.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present

invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

5 Figure 1 is a schematic side view of a conventional elliptical exercising apparatus;

Figure 2 is a schematic side view of the preferred embodiment of an elliptical exercising apparatus according to the present invention;

10 Figure 3 illustrates the elliptical exercising apparatus of the present invention in a state of use;

Figure 4 illustrates how a pedal member slides toward a front section of a pedal axle when a handle is pulled rearwardly;

15 Figure 5 illustrates how the pedal member slides toward a rear section of the pedal axle when the handle is pushed forwardly; and

Figure 6 illustrates distance relations between the pedal axles and the pedal members.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

20 Referring to Figure 2, the preferred embodiment of an elliptical exercising apparatus according to the present invention is shown to comprise a main frame 10, a crank assembly 20, two handles 32, two rocker arms 30, two pedal axles 40, two pedal members 50, and two
25 connecting arms 60.

The main frame 10 has a base support 11 adapted to be disposed on the ground, and an upstanding support

12 extending upright from a front end portion of the base support 11. The main frame 10 is substantially similar to the main frame 1 of the aforementioned conventional elliptical exercising apparatus so that a detailed description of the same will be dispensed herewith for the sake of brevity.

The crank assembly 20 includes a crank wheel 21 connected rotatably to a rear end portion of the base support 11, and two crank members 22 connected pivotally and respectively to two opposite sides of the crank wheel 21. The crank assembly 20 is substantially similar to the aforementioned crank assembly 2 of the conventional elliptical exercising apparatus so that a detailed description of the same will be dispensed herewith for the sake of brevity.

The handles 32 are connected pivotally and respectively to two opposite sides of the upstanding support 12 via a pivot member 31.

The rocker arms 30 are connected respectively to the handles 32. Each of the rocker arms 30 has an upper connection part 34, and a lower connection part 35 opposite to the upper connection part 34. The upper connection part 34 has a fixed connection plate 341 with a pivot member 342. The lower connection part 35 has a pivot member 351. Each of the rocker arms 30 is telescopic, and has a retractable and extensible section 33 extending from the upper connection part 34 to the

lower connection part 35.

The pedal axles 40 are disposed respectively on two opposite sides of the base support 11. Each of the pedal axles 40 has a front end 43 connected pivotally to the connection plate 341 on the upper connection part 34
5 of a corresponding one of the rocker arms 30, and a rear end 44 connected to a corresponding one of the crank members 22. Each pedal axle 40 has a front section 41 and a rear section 42 connected to and forming an angle
10 with the front section 41.

Each of the pedal members 50 is mounted slidably on the rear section 42 of a corresponding one of the pedal axles 40.

The connecting arms 60 are disposed respectively on the two opposite sides of the base support 11. Each of the connecting arms 60 has a front end 61 connected
15 pivotally to the pivot member 351 on the lower connection part 35 of a corresponding one of the rocker arms 30, and a rear end 62 connected pivotally to a corresponding one of the pedal members 50.
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Referring to Figure 3, when the present invention is in use, the feet 71 of the user 70 step respectively on the pedal members 50, and the hands 72 of the user 70 grasp respectively the handles 32. Through
25 coordination of the swinging movement of the handles 32, the annular movement of the crank members 22, and frontward and rearward sliding movement of the pedal

members 50 brought along by movement of the connecting arms 60, an exercise simulating a striding movement is effected.

Referring to Figure 4, when the user 70 (see Figure 3) pulls one of the handles 32 toward his body, the telescopic section 33 of the rocker arm 30 will move away from the user's body, bringing along the connecting arm 60, which in turn pulls the pedal member 50 to slide along the rear section 42 of the pedal axle 40 toward a location proximate to the front section 41. At the same time, the upper connection part 34 of the rocker arm 30 moves frontwardly bringing along the pedal axle 40 and the crank member 22.

When the user 70 pushes one of the handles 32 away from his body, the telescopic section 33 of the rocker arm 30 will move toward the user's body and pushes the connecting arm 60, which in turn pushes the pedal member 50 to slide toward the rear end 44 of the pedal axle 40. Simultaneously, the upper connection part 34 of the rocker arm 30 pushes the pedal axle 40 and the crank member 22 to move rearwardly, as shown in Figure 5. As such, through alternate push-pull action on the handles 30 by the hands 72 of the user 70, the crank members 22 produce a continuous rotation so that the pedal members 50 move alternately in elliptical motions following a pointed-front and rounded-rear outline. Thus, the feet 71 of the user 70 will naturally stretch

frontward and rearward, effecting a striding exercise.

Referring back to Figure 2, since the pedal members 50 slide along the respective pedal axles 40 and are moved by the connecting arms 60, the pedal members 50 will not be limited by the crank members 22, but will move along with the connecting arms 60. The front-to-rear distance that can be traveled by the pedal members 50 is determined by the distance between the lower connection parts 35 of the rocker arms 30, and not by the lengths of the crank members 22.

Referring to Figure 6, the connecting point of the rocker arms 30 and the upstanding support 12 is defined as point A, the pivot connecting points of the upper connection parts 34 and the front end 43 of the pedal axles 40 are respectively defined as points B_1 and B_2 , and the pivot connecting points of the lower connection parts 35 of the rocker arms 30 and the connecting arms 60 are respectively defined as points C_1 and C_2 . A triangle is defined by line AC_1 , line C_1C_2 , and line AC_2 . Particularly, the ratio of the length of the rocker arm 30 (i.e., the length from point A to point C_1) to the length measured from the pivot member 31 to the upper connection part 34 (i.e., the length from point A to point B_1) is proportionately equal to the ratio of the distance between the lower connection parts 35 (i.e., the distance from point C_1 to point C_2) to the distance between the upper connection parts 34 (i.e., the distance

from point B_1 to point B_2). Since the pedal axle 40 is connected pivotally and respectively to the upper connection part 34 and an end of the crank member 22, the distance between the ends (P, Q) of the two crank members 22 is substantially equal to the distance between point B_1 to point B_2 of the upper connection parts 34. The distance from point B_1 to point B_2 will thus be limited by the crank members 22 so that the largest distance from point B_1 to point B_2 will be equal to the total length of the two crank members 22. At this time, if the length from point A to point C_1 is equal to twice the length from point A to point B_1 , then, the largest distance between point C_1 to point C_2 will be equal to twice the largest distance between point B_1 to point B_2 (i.e., equal to the length of four crank members 22), so that the largest front-to-rear distance that can be traveled by the pedal members 50, i.e., the striding distance of the user 70, is four times the length of each crank member 22. Furthermore, since each rocker arm 30 has a retractable and extensible section 33, its length can be adjusted. Through the presence of the retractable and extensible section 33, the ratio of the length of the rocker arm 30 to the length measured from the pivot member 31 to the upper connection part 34 can be altered, which in turn can control the swinging amplitude of the connecting arms 60, thereby achieving adjustment of the striding distance of the user 70.

It should be noted that even if the length of each rocker arm 30 is kept unchanged, the striding distance of the user 70 can be adjusted by changing locations of the pivot connecting points of the rocker arms 30 with the corresponding pedal axles 40.

Therefore, the elliptical exercising apparatus of the present invention does not require changing of the lengths of the crank members 22 to cope with the desired striding distance of the user 70. Through cooperation of the rocker arms 30, the pedal axles 40, the pedal members 50, and the connecting arms 60, the striding distance between the feet 71 of the user 70 can be enlarged, thereby effectively stretching the leg muscles.

While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.